MONTHLY WEATHER REVIEW.

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VOL. XXXIII. NOVEMBER, 1905. No. 11

INTRODUCTION.

The MONTHLY WEATHER REVIEW for November, 1905, is based on data from about 3470 stations, classified as follows:

Weather Bureau stations, regular, telegraph, and mail, 176; West Indian Service, cable and mail, 13; River and Flood Service, regular 52, special river and rainfall, 363, special rainfall only, 98; cooperative observers, domestic and foreign, 2565; total Weather Bureau Service, 3267; Canadian Meteorological Service, by telegraph and mail, 33; Meteorological Service of the Azores, by cable, 2; Meteorological Office, London, by cable, 8; Mexican Telegraph Company, by cable, 3; Army Post Hospital reports, 18; United States Life-Saving Service, 9; Jamaica Weather Service, 130.

Since December, 1904, the Weather Bureau has received an average of about 1700 reports from as many observers and vessels, giving international simultaneous observations over the Atlantic and Pacific oceans at 12 noon, Greenwich time, or 7 a. m., seventy-fifth meridian time. These are charted, and, with the corresponding land observations, will form the framework for daily weather charts of the globe.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. S.I. Kimball, General Superintendent of the United States Life-Saving Service; Capt. H. M. Hodges, U. S. N. (Retired), Hydrographer, United States Navy; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Señor Enrique A. Del Monte, Director of the Meteorological Service of the Republic of Cuba; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

Attention is called to the fact that at regular Weather Bureau stations all data intended for the Central Office at Washington are recorded on seventy-fifth meridian or eastern standard time, except that hourly records of wind velocity and direction, temperature, and sunshine are entered on the respective local standards of time. As far as practicable, only the seventy-fifth meridian standard of time, which is exactly five hours behind Greenwich time, is used in the text of the REVIEW. The standards used by the public in the United States and Canada and by the cooperative observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. The Hawaiian standard meridian is 157° 30′, or $10^h\ 30^m$ west of Greenwich. The Costa Rican standard meridian is that of San José, $5^h\ 36^m$ west of Greenwich.

Barometric pressures, whether "station pressures" or "sea-level pressures", are now reduced to standard gravity, so that they express pressure in a standard system of absolute measures.

In conformity with Instructions No. 43, March 29, 1905, the designation "voluntary", as applied to the class of observers performing services under the direction of the Weather Bureau without a stated compensation in money, is discontinued, and the designation "cooperative", will be used instead in all official publications and correspondence.

Hereafter the titles of the respective forecast districts will be as used in the current REVIEW to accord with paragraph 236 of Station Regulations, dated June 15, 1905.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

The first important storm of the month over the eastern Atlantic crossed the British Isles during the 11th and 12th. From the 17th to 20th a storm advanced from the ocean west of Portugal northeastward over France. The third decade of November was stormy on the British coasts and the North Sea, and during the 26th a severe gale prevailed over the English Channel. In the region about the Azores the month was quiet, and the storms that reached the western Atlantic from the American Continent were of moderate intensity.

In the United States a larger proportion of the storms first appeared over the British Northwest Territory, and in several instances they were traced from British Columbia. The severer storms, however, advanced from the Middle West and Southwest over the Great Lakes, where their frequency and intensity made November, 1905, a notably disastrous month. The severer storms of this month attended the passage over the Great Lakes on the 24th of low area XVI–XVII and on the 28th of low area XX. Low areas XIII and XV caused heavy gales on the north Pacific coast on the 17th and 18th, and the rains that attended these depressions ended the dry season in California. Ample and timely advices and warnings regarding the gales were issued to Lake, Gulf, and seacoast ports.

The first important cold wave of the season swept from the British Northwest Territory to the Atlantic coast from the 26th to 30th, with snow in the Northwestern States, a minimum temperature of —24° at Havre, Mont., zero temperature as far south as central Nebraska, freezing weather in the interior of the Gulf States, and a fall in temperature of 20° to 40° in the Atlantic coast States north of Florida. Timely advices were issued in connection with this cold wave.

BOSTON FORECAST DISTRICT.

The chief storm of the month was that of the 28–29th, during which gales of great force prevailed along the southern coast, delaying and inconveniencing shipping generally. During this storm the schooner *Charles E. Sears* of Calais, Me., was wrecked off Chatham, Mass., on November 30. Warnings were issued and signals displayed well in advance of the storm. Storm warnings were also issued on the 1st, 6th, 13th, 15th, 17th, and 24th for storms of more or less violence that passed over or in the vicinity of this territory. A cold-

wave warning was issued on the 29th, which was fully justified. A cold wave passed over this section on the 13–14th for which no warnings were issued, although the forecasts announced "colder weather" for all sections of the district. There were no gales along the coast for which warnings were not issued.—*J. W. Smith, District Forecaster.*

CHICAGO FORECAST DISTRICT.

Several energetic storms crossed the Great Lakes, the severest of which reached the Lakes on the 28th, causing an unusually large number of wrecks. Wrecks also occurred during previous storms of the month. Warnings were issued well in advance of the gales.

From the 27th to 29th a cold wave overspread the entire district. Timely advices were issued of the approaching cold, and on the 27th forecasts of heavy snow were made for the Dakotas, Minnesota, and Montana.—*H. J. Cox, Professor and District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

Six general disturbances materially affected the weather conditions of this district, of which two caused severe storms on the 23d, 24th, 28th, and 29th, the latter being followed by the first cold wave of the season.—*F. J. Walz, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

Storm warnings were issued for the west Gulf coast on the 29th, and high winds occurred at many points.

Frost warnings were issued twice in the first decade of the month for Arkansas and northern Louisiana, and frosts occurred in each instance over a great portion of the territory indicated. Warnings for freezing temperatures were issued on the 28th for Oklahoma and the Texas panhandle, and cold-wave warnings were ordered on the 29th for Arkansas, northern Louisiana, and the interior of Texas, the warnings in each case being verified.

In commenting on the cold weather and the warnings issued in connection therewith, the Daily States, of November 30, 1905, says:

> The forecasts and warnings of the United States Weather Bureau service in connection with this cold weather have been exceptionally accurate, both as to the intensity of the cold and the time of its occurrence. The money value of such a warning service is beyond computation.
>
> *I. M. Cline, District Forecaster.*

DENVER FORECAST DISTRICT.

The most important weather changes of the month occurred in connection with a disturbance that crossed the district on the 27th and 28th, and timely warnings were issued for the cold wave that followed the disturbance.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The first half of the month was abnormally dry and during the last half several barometric depressions were attended by general rains.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND FORECAST DISTRICT.

There were two stormy periods, one from the 17th to 20th, and the other from the 25th to 30th, the heaviest winds occurring on the 17th. Warnings were issued on the 27th for the cold wave that overspread the district on the 28th.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The only floods of the month occurred in the Gila, Salt, and lower Colorado rivers in southern Arizona. No river and flood service is maintained in this section, and no detailed reports of the floods have been received. From press reports, however, it has been learned that the floods were the greatest since 1891, when the southern portion of the city of Phoenix was inundated by flood waters from the Salt River. The floods were caused by the heavy rains and snows that fell over Arizona on November 26 and 27. The rains had been preceded by heavy snows in the Verde and Salt watersheds, and these snows, melted by the warm rains, were doubtless the principal factors in the flood formation. It was reported that the Arizona dam near Phoenix was greatly damaged, as were also numerous irrigation works, and several bridges were either badly injured or carried entirely away.

The lower Colorado River was also in flood a day or two later, and in the vicinity of Yuma was higher than any time since 1891 when the floods were somewhat more severe throughout the Colorado watershed. The only damage done at Yuma was the flooding of the electric lighting plant, the levees having been kept intact by a vigilant patrol. The Imperial Irrigation Works was reported as practically destroyed, and hope of diverting the river back to its old channel was abandoned.

There was somewhat less ice during the month than during the corresponding period of the previous year. Slush ice first appeared in the Missouri River at Bismarck, N. Dak., on the 1st, but the river did not freeze over until the 28th when navigation was suspended. In the lower river slush ice was running as far as Omaha, Nebr., on the 30th.

No ice of consequence was observed in the Mississippi River south of Minnesota, although it was quite heavy on the 26th and 27th at Reeds Landing, Minn.

The highest and lowest water, mean stage, and monthly range at 273 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Divison.

The following summaries relating to the general weather and crop conditions during November are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

Alabama.—Generally dry, mild, and favorable for work. Many warm days, but several moderately cold periods. Temperature reached 20° in northern counties on the 29th and 30th. Gathering of cotton and corn practically completed by the 20th, though a little cotton was still outstanding in scattered localities at close of month. Corn and minor crops made satisfactory yields, though quality of corn was inferior in many localities. Fall plowing and seeding progressed slowly. Early sown wheat and oats made good stands.—*F. P. Chaffee.*

Arizona.—The average temperature for the Territory was 1° below the normal; the average precipitation 3.99 inches in excess. Killing frost on the 28th, 29th, and 30th damaged gardens. Floods in the Salt and Gila rivers washed farm lands and roadways and carried away bridges. Much wheat and barley were sown; early planted growing well. Seventh and last cutting of alfalfa completed. Oranges, grape fruit, and dates yielding largely. Ranges much improved by new growth of grass. Stock in excellent condition. Water supply plentiful.—*L. N. Jesunofsky.*

Arkansas.—The month was generally favorable for farm work and the growth of late crops. Plowing for spring crops was delayed in some localities by the wet condition of the ground. Cotton picking was about completed, and the crop secured in fair condition. Wheat, oats, and rye were up to good stands. Irish and sweet potatoes made good yields. Fruit buds were too far advanced.—*C. M. Strong.*

California.—The heavy rainfall in southern California at the beginning of the month, and throughout the greater part of the State from the 26th to the 30th, caused a marked improvement in farming conditions generally. The seasonal rainfall was still far below average except in the south, but in most places the precipitation had been sufficient to soften the soil and start pasturage. The snowfall in the mountains was quite